Radio Spectrum Inventory Acts and DoD Spectrum Strategy

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Situation

- Opportunities for economic growth are driving U.S. and other nations to make spectrum available for wireless voice, video and data applications
- Federal, including military, use is often misrepresented as “underutilized” - has been targeted for reallocation
- March 2009 Congress introduced legislation to mandate a “spectrum inventory”—strong support from White House
- FCC’s “National Broadband Plan” seeks to extend broadband access to all citizens – plan due out in February 2010
- Wireless industry calling for 800 MHz to meet new demand – FCC Chairman said U.S. is facing a “looming spectrum crisis”

Commercial Spectrum Pressure

- AT&T, Verizon, Sprint, T-Mobile, Leap, MetroPCS
  - 4G mobile (LTE) - 1755-1850 MHz
  - 3G/4G mobile (CDMA or LTE) - 420-450 MHz
- Google, Microsoft, Intel, Dell
  - White space/cognitive radio networks/devices - 225-400 MHz
- Clearwire, Intel, Comcast
  - 4G fixed/mobile (WiMAX) - 3.4-3.65 GHz
- Alfred Mann Foundation, Medical Device Manufacturers
  - Low power medical devices - 420-450 MHz
- Utility Companies
  - Smart Grid Broadband (WiMAX/LTE), 1800-1830 MHz

History of Spectrum Reallocation

- The U.S. Federal government has lost exclusive access to approximately 5 GHz of spectrum since the 1980s
- The Omnibus Budget Reconciliation Act of 1993 and the Balanced Budget Act of 1997 transferred 237 MHz (under 5 GHz) of Federal spectrum – all used by DoD
- Over $33B generated from spectrum auctions since 2006
- DoD currently vacating 1710-1755 MHz – 4 years, ~$355M – on schedule, within budget
- Current statute requires SECDEF and CJCS certification that replacement spectrum will maintain essential military capability

Radio Spectrum Inventory Acts

- Scope
  - (House) 225-10000 MHz
  - (Senate) 300-3500 MHz, at a minimum
- Required elements
  - (House) Approximation of the extent to which each Federal or non-Federal user is using, by geography, each band of frequencies, such as the amount and percentage of time of use, number of end users, or other measures as appropriate to the particular band and radio service
  - (House) Contour maps or other information that illustrate the coverage area, receiver performance, and other parameters relevant to an assessment of the availability of spectrum in each band
  - (Senate) Contour maps that illustrates signal coverage and strength; approximate geo-location of base stations of fixed transmitters
- 180 days initial execution/reporting - annual (House) or biennial (Senate) updates thereafter

Radio Spectrum Inventory Acts

- (Both) Internet-accessible web portal, near real-time update
- Release of Sensitive Information:
  - (House) Agencies certify information as harmful to national security if they want it exempted from public disclosure
  - (Senate) Agencies to petition NTIA for exemption from public disclosure of information for national security reasons - Requires "clear and convincing evidence", exemptions expire after 2 years
- Reallocation Recommendation (House)
  - Identification, by relevant geographic area, of the least utilized blocks of spectrum inventoried, and an explanation of the basis for that identification
  - Recommendation of which, if any, of such spectrum identified the Federal Government should reallocate and an explanation of the basis for that recommendation

DoD Recommendations on RSIA

Security	Include provision for agencies to exclude from public release any information that would be harmful to national security
Reallocation	Remove the reallocation recommendation provision and defer for further study
Mission	Inventory should include missions/activities supported to explain why the spectrum is needed
Time to complete	Increase time mandated to complete inventory from 180 days to 1 year. Increase time mandated to develop reallocation recommendations from 1 year to 2 years.
Scope	Limit inventory to 225 MHz to 3.7 GHz

DoD Engagement on RSIA

- Jul 8 – Senate unanimously reports RSIA out of Committee, House introduces own version of RSIA
- Jul 23 – ASD(NII) concern letter sent to National Security Council
- Jul - Aug – ASD(NII) and DSO brief HASC/SASC and Commerce committees
- Aug 21 – RSIA briefed to CJCS in JCS Tank
- Jun - Oct – ASD(NII) helped draft Administration's Statement of Views on Radio Spectrum Inventory Acts
- Nov 17 – House asked for Gov't Accountability Office review of spectrum use
- Nov 30 – Statement of Administration Views sent to Congress
- Dec 8 – Interagency meeting with NTIA

Current status – Senate amending bill to address Administration concerns, House bill still in Committee

DoD Spectrum Strategy

- **Goal:**
  - Ensure spectrum access to meet warfighter needs

- **Objectives:**
  - Optimize DoD's use of the spectrum
  - Improve DoD's overall spectrum efficiency
  - Influence spectrum availability in the U.S. and worldwide

Near-Term Strategy (FY 2010)

Four Primary Axes

- Develop and promulgate a strong strategic message
- Influence, prepare for, and conduct a spectrum inventory
- Analyze DoD spectrum requirements and identify potential trade space
- Establish the policy framework to improve spectrum efficiency

Strategy Implementation

Develop & Promulgate Strategic Message

- ✓*DoD Spectrum Symposium*
- ✓*FCC Chairman visit to CENTCOM*
- ✓*COCOM J6 Conference*
- DoD Spectrum Workshop
- Defense Business Board Study
- OSD Testimony/Senior leadership speeches

Influence & Prepare for Inventory

- ✓*DoD input to Statement of Administration Views for S. 649 and HR 3125*
- ✓*DoD Congressional engagement regarding Inventory*
- Spectrum Security Classification/Releaseability Guide
- If passed, influence NTIA's spectrum inventory implementation plan

Requirements & Trade Space Analysis

- Requirements Analysis
- Commercial Demand Assessment
- Vulnerability Assessment (i.e. where DoD utilization could be perceived as low)
- Operational Impact Assessment (COAs, etc)
- Spectrum Demand Study
- Spectrum Technology Analysis

Improve Policy Framework

- Develop Spectrum Sharing Technologies Roadmap
- Complete DTMs for:
  - Enterprise resource management
  - Spectrum efficiency
  - Spectrum-dependent system integration
- Complete DoD Instruction for Data Sharing Strategy
- Continue enforcement of Waveform Policy & Roadmap

Way Ahead

- DASD (C3S2) Spectrum Data Call Memo – December 2009
- ASD (NII) FY10 Spectrum Strategy Memo – December 2009
- FCC's National Broadband Plan – to be published February 2010
- Radio Spectrum Inventory Act – TBD

Backup

Policy Initiatives

- **ENTERPRISE RESOURCE MANAGEMENT**:
  - Response to tactical operations and dynamically de-conflict Spectrum Dependant systems based on topographical awareness of military operations and the EME in near real time.
  - Loosely coupled SOA architectures to coordinate and control networking, sensor, and EW spectrally dependent resources.
  - Real time Situational Awareness of Spectrum, Network and Communication Configuration Management Systems.
- **INTEGRATION OF SPECTRUM DEPENDENT SYSTEMS:**
  - Adaptive electromagnetic compatibility through architecture and interfaces to enable near real time spectrum de-confliction.
  - RF sampling to optimize performance and provide feedback to the resource manager.
  - Network EW and sensor systems to the Global Information Grid (GIG)
- **SPECTRAL EFFICIENCY:**
  - Develop the implementation and policy/prioritization strategy to pursue network and spectrally efficient spectrum dependent systems.
  - Adopt performance based metrics to mandate spectrally efficient waveforms and networks – for all wireless implementations including sensors and communications.
  - Leverage new technologies, like DARPA XG and WNAN, after conducting dynamic spectrum security review.

Related DoD Systems

AIR

- UAS: Unmanned Aerial Systems (Global Hawk; Predator; Raven…etc)
- F-22; F-35 (Joint Strike Fighter); F/A-18 E/F; V-22
- AWACS: Airborne Warning and Control System
- JSTARS: Joint Surveillance Target Attack Radar
- PGMs: Precision Guided Munitions
- E2C and E2D: Hawkeye Surveillance and Reconnaissance
- MP-RTIP: Multi-Platform Radar Technology Insertion Program

SPACE

- MUOS: Mobile User Objective System
- GPS: Global Positioning System
- NMT: Navy Advanced Multi-band Terminal
- MST: Multi-channel Satellite Terminal
- MILSATCOM: Military Comms Program
- UFO: UHF Follow-On Program
- WGS: Wideband Global SATCOM

GROUND

- FCS: Future Combat System
- HQ: Have-Quick Communications Systems
- JTRS: Joint Tactical Radio System
- WIN-T: Warfighter Information Network Tactical
- MCBR: Mobile Counter Battery Radar
- Blue Force Tracking System
- EPLRS: Enhanced Position Location Reporting Syst
- DWTS: Digital Wideband Transmission System
- PATRIOT Radar
- G/A-TOR: Ground/Air Task Oriented Radar
- PAVE-PAWS: Precision Acquisition Vehicle Entry-Phased Array Warning System
- PARCS: Phased Array Radar Control System
- BMEWS: Ballistic Missile Early Warning System

MARITIME

- AEGIS Radar System
- AMDR: Air and Missile Defense Radar
- MFR: Multi Function Radar
- VSR: Volume Search Radar
- LCS: Littoral Combat Ship
- DD(X): Next-Generation Zumwalt Destroyer
- CG(X): Next-Generation Cruiser
- CVN-78: NIMITZ Class Aircraft Carrier
- EFV: Expeditionary Fighting Vehicle
- JHSV: Joint High Speed Vessel